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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/343,092

06/30/1999

HIDEO SAMURA

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7482

20277

7590

01/24/2005

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EXAMINER

NGUYEN, LAM S

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 01/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/343,092	Applicant(s) SAMURA, HIDEO	
	Examiner LAM S NGUYEN	Art Unit 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-7,11 and 12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-7 and 11 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 4-7, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cruz-Uribe (US 4680595) in view of Chang (US 6099111) and Hasegawa et al. (US 5530465).

Cruz-Uribe et al. discloses a head for ink-jet printer comprising:

a substrate on which a plurality of ink nozzles (*FIG. 3, elements 34, 68*) and a plurality of ink passages (*FIG. 3, element 66*) each communicating separately to each of the ink nozzles;

an inorganic substrate which is joined with said silicon substrate and is provided with ink chambers (*FIG. 3, element 30*) each communicating separately to each of the ink passages (*FIG. 3, element 66*); and

a piezoelectric element (*FIG. 3, element 50*) of ferroelectric substance for changing separately a capacity of each of the ink chambers to jet an ink from said ink nozzles through said ink passages;

wherein said ink passages are fine as compared with said ink chambers and said ink nozzles are fine as compared with said ink passages (*FIG. 3, elements 30 and 66: The width of the ink passage 66 is narrower than the one of the ink chamber 30*); and

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wherein said inorganic substrate has a common ink supply port (*FIG. 3-5, element 40, 28, 24, 26*) for supplying ink to said plurality of ink passages (*FIG. 4*) at a portion on a surface of said inorganic substrate.

Cruz-Urbe et al. does not disclose wherein the common ink supply port is located between a plurality of said piezoelectric elements, wherein said ink nozzles have tapered configurations (**Referring to claim 4**), and an ink tank for storing ink supplied to said ink chambers of said printer head (**Referring to claim 7**).

Chang discloses an ink jet recording head having piezoelectric elements (*FIG. 2, element 11, 12*) acting as pressure generating elements on ink chambers (*FIG. 2, element 3, 4*) to eject ink drops through nozzles having tapered configurations (*FIG. 2, elements 7, 8*), wherein the ink chambers are filled with ink through a common ink supply port from an ink tank (*FIG. 2, element 2, 13, 20, 22*) that is located between a plurality of said piezoelectric elements (*FIG. 2, element 11, 12*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the printhead disclosed by Cruz-Urbe et al. such that locating the common ink supply port between a plurality of said piezoelectric elements as disclosed by Chang. The motivation of doing so is to prevent crosstalk as much as possible from accruing thereby allowing the ink droplet ejection characteristics to be stabilized as taught by Cruz-Urbe et al. (*column 2, lines 28-31*).

Cruz-Urbe et al. also does not disclose wherein the substrate on which the plurality of ink nozzles and the plurality of ink passages are formed by a plasma etching method is a silicon substrate, wherein said silicon substrate has a construction in which plural silicon substrates are laminated, and wherein said ink nozzles and said ink passages

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are communicated by laminating the silicon substrate in which said ink nozzles are processed and the silicon substrate in which said ink passages are processed. (**Referring to claims 5-6**).

Hasegawa et al. discloses an ink jet head provided with a plurality of nozzles and ink passages arranged in an array on laminated silicon substrates in which the ink nozzles and the ink passage are communicated (*Abstract and column 2, lines 11-14, FIG. 8B, elements 101, 107*), wherein the plurality of nozzles and ink passages are formed by a plasma etching method (*column 15, lines 21-30 and column 16, lines 14-30*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the printhead disclosed by Cruz-Urbe et al. such that forming the ink nozzles and the ink passages on the silicon substrate as disclosed by Hasegawa et al. The motivation of doing so is to obtain high nozzle density even when number of nozzles is increased as taught by Hasegawa et al. (*column 4, lines 34-35*).

Cruz-Urbie also disclose the following claimed invention:

Referring to claim 11: wherein said ink passages have a cross-sectional area less than a cross-sectional area of said ink chambers, and wherein said ink nozzles have a cross-sectional area less than a cross-sectional area of said ink passages (FIG. 3, elements 34,30, 66).

Allowable Subject Matter

Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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The most pertinent art fails to disclose wherein a pitch of the ink nozzles is approximately 20 μm . Therefore, the claimed invention is not disclosed by the cited prior art.

Response to Arguments

Applicant's arguments filed 11/05/2004 have been fully considered but they are not persuasive.

In response to applicant's argument that one having ordinary skill in the art would not have been motivated to modify Cruz-Urbe in view of Chang based on the motivation asserted by the examiner because the citation fails to teach that the position of a common ink supply port relative to piezoelectric elements plays any importance in achieving this asserted benefit. The examiner does not agree with the above argument. As clearly stated by Chang that since the connection of the ink tank via the opening (ink supply port) which is close to an ink flow path and elongates along the arrangement direction of the pressure generating chamber (also the piezoelectric elements, as shown in FIG. 2) is one of some factors that prevents a crosstalk from occurring (column 2, lines 22-31). Therefore, the location of the common ink supply port relative to piezoelectric elements plays an importance in achieving the benefit asserted by the examiner.

In addition, the applicants argued that the examiner failed to link the proposed modification (i.e., forming a substrate and plurality of ink passages using plasma etching and lamination) with the asserted benefit (i.e., obtaining high nozzle density even when number of nozzles is increased). The examiner does not agree with the above argument. As stated in column 2, line 62 to column 3, line 8, Hasegawa et al. points out that forming the printhead by using anisotropic etching can not increase the density of the nozzles on

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the head. Thus, in at least one of the embodiments, Hasegawa et al. suggests using plasma etching (column 16, lines 20-30) for forming the printhead in order to obtain the advantage of the invention, which is stated in the "Objects of the invention" section as increasing the nozzle density. In addition, as based on MPEP 2113 that states "*The patentability of a product does not depend on its method of production*" and because the claim is a product claim (a head for inkjet printer), the method (the plasma etching method) for forming the product (head) is considered but not given patentability weight.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

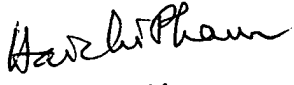
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D MEIER can be reached on (571)272-2149. The fax phone

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number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN
January 17, 2005


HAI PHAM
PRIMARY EXAMINER